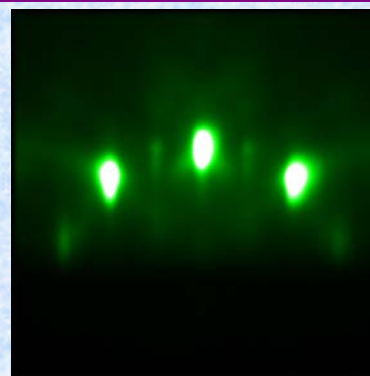


A Structural Monitoring System for a Laser-MBE/STM Facility for Materials Research & Education

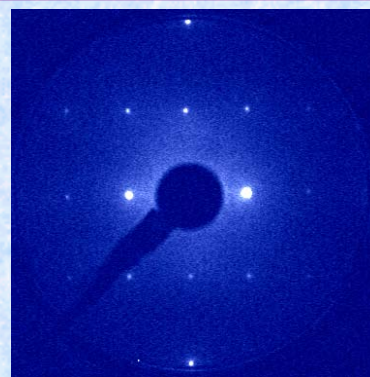
Zhang, Florida International University, DMR-0215929

Exploring new physical phenomena and exploiting materials tailoring for desired functionalities in artificially structured materials are of the focus in Materials Physics. This award enabled the completion of a unique laser-MBE/LEED/STM facility capable of growing and characterizing artificial superstructures of complex materials, especially transition metal oxides. Our goal is to: 1) exploit materials tailoring for desired functionalities, 2) explore new physical phenomena in artificially structured materials, such as the structural and electronic reconstruction at the surface and interface, and 3) educate a new breed of materials scientists with an expertise in science-driven nano-fabrication.

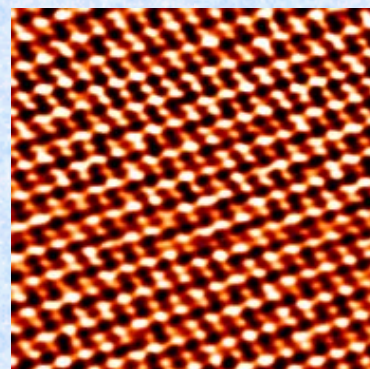
The funding of this instrumentation brings together researchers from Florida International Univ., the Univ. of New Orleans, and the Univ. of Tennessee/Oak Ridge National Lab.



An image of Cu(110) surface with the funded reflection high-energy diffraction (RHEED) setup. This RHEED setup allows monitoring material growth in-situ with a differential pumped electron gun purchased from STSIB Instruments, Inc.



An Image of Cu(110) surface with the funded low energy electron diffraction (LEED) optics purchased from Omicron Instruments. This optics is used to determine the lattice structure and symmetry in the proximity of surface.



An image of P(VDF-TrFE) copolymer surface with our scanning tunneling microscope (STM). This ultra-high vacuum STM provides information of local structural and electronic properties at the surface of the material fabricated *in-situ* with our laser-MBE setup.

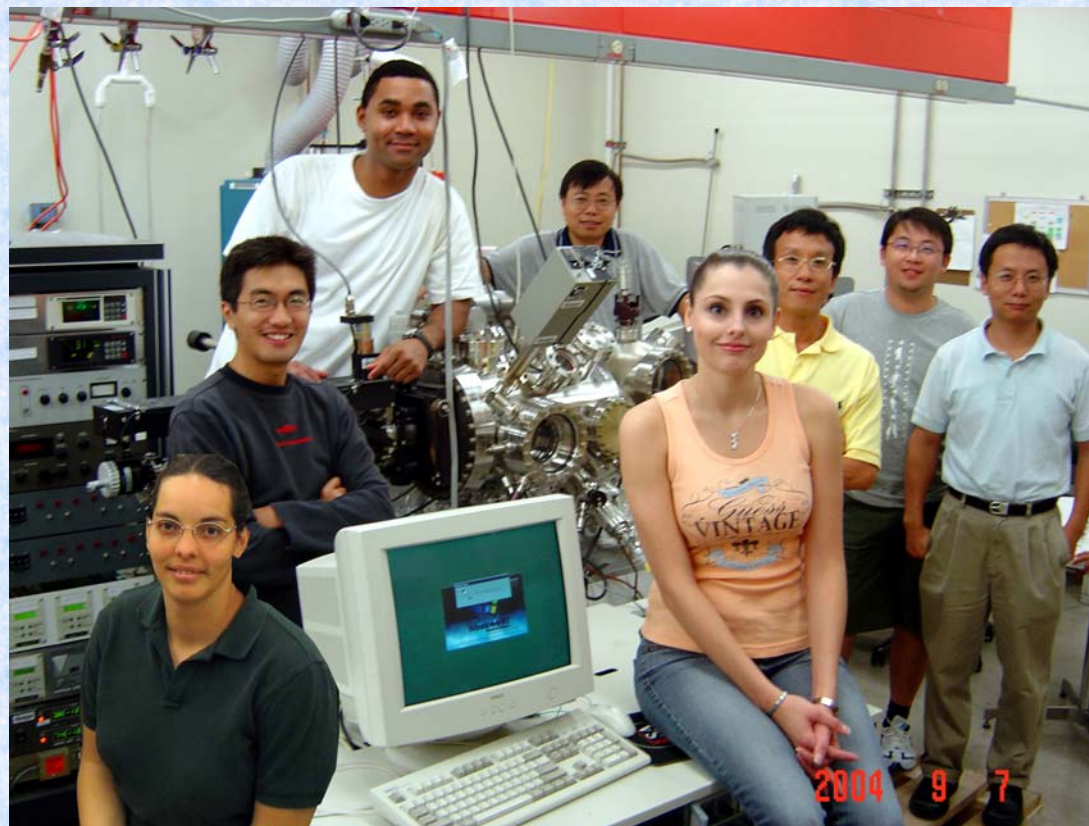
A Structural Monitoring System for a Laser-MBE/STM Facility for Materials Research & Education

Zhang, Florida International University, DMR-0215929

Sarah Bryan and **Stephane Stacco** (a Hispanic student) are two undergraduates in Physics. They are learning how to use the STM, LEED and other techniques in our Materials Physics Lab. They have also participated in the construction of this facility.

Fernanda Foetter, a Latina student, first became involved in this work in 2002 as an undergraduate at FIU. She is now a graduate student and her research will involve the fabrication and characterization of artificially structured oxide materials.

Hao Sha and **Yanxin Liu** are two new graduate students who will be working on this funded facility for their thesis research. **Chenxi Lu**, a senior graduate student, has been working on his thesis with this instrument.



This funded facility with the integrated capability of materials growth plus *in-situ* characterization has attracted both graduates, undergraduates, etc., for their thesis research and educational training to face the technology-driven world. From left to right, are Fernanda Foetter, Hao Sha, Stephane Stacco, Chenxi Lu, Sarah Bryan, Jiandi Zhang (PI), Yinxin Liu, and Lei Cai (post doc.).